ABSTRACT OF THE DISCLOSURE

Each of the embodiments of the present invention employs a patterned mask located at a distance from a linear detector array. A point radiating source illuminates the aperture to cast an image onto the array. A computer is employed to identify one or more frequencies in the frequency domain to determine the image scale and shift along the detector array axis. The disclosed method of determination automatically allows determination of the magnification of the aperture image, with this method employing frequency domain techniques, with the aperture pattern automatically being re-scaled to match that of the actual image, so that an accurate determination of pattern shift can be made. A first embodiment of the present invention has two variations, one of which employs the use of multiple single frequency components and phase methodology, the second of which uses multiple single frequency components as well as a variable frequency component, all of which are identified in "frequency domain." The particular locations of frequency components as well as the corresponding phases of single frequency components allow the determination of the magnified image shift on the detector axis. In the second embodiment, a composite image is also used except that only one single frequency component is used in addition to a non-periodic function provided with unique auto-correlation. The single frequency function is used to determine the aperture image magnification. This scale factor is then used to resize the

aperture image to correspond to the received image. The two functions can then be cross-correlated to yield the precise image displacement on the detector surface.